

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of : **BOX PATENT APPLICATION**

Mathieu PINAULT et al. : Examiner: Unassigned

Serial No.: Unassigned : Group Art Unit: Unassigned

Filed: Herewith :

For: **PROCESS FOR TREATMENT OF C4 HYDROCARBONS THAT COMPRISE BUTADIENE AND ACETYLENE COMPOUNDS THAT COMPRISE STAGES FOR DISTILLATION AND SELECTIVE HYDROGENATION**

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination, Applicants wish to amend the above-identified application as indicated below:

**IN THE CLAIMS:**

Please amend the claims as follows:

2. (Amended) A process according to claim 1, wherein the feedstock is a steam-cracking effluent that contains for the most part hydrocarbons with four to five carbon atoms per molecule.

3. (Amended) A process according to claim 1, wherein the butadiene content in the feedstock is at least equal to 20% by weight.

4. (Amended) A process according to claim 1, wherein the feedstock contains at most 20% by weight of acetylene compounds.

5. (Amended) A process according to claim 1, wherein the draw-off flow rate is at most equal to twice the flow rate of the feedstock introduced into the distillation zone.

6. (Amended) A process according to claim 1, wherein the feedstock is introduced at a level that corresponds to substantially the center of the distillation column; the lateral draw-off level is located below said center of the column at a height that corresponds to fewer than five theoretical plates from said center; and the hydrogenation effluent is recycled above the center of the column at a level that corresponds to a height within the first five theoretical plates from the top of the column.

7. (Amended) A process according to claim 1, conducting the process so that the ratio of the acetylene compounds/butadienes concentrations is the highest at the level of the lateral draw-off.

8. (Amended) A process according to claim 1, wherein the operating conditions of the distillation zone are as follows:

Number of theoretical plates: 35-45

Absolute pressure: 4-10 bar,

Top temperature: 30°C to 50°C

Bottom temperature: 90°C to 150°C

9. (Amended) A process according to claim 1, wherein the operating conditions in the hydrogenation zone are as follows:

Absolute pressure: 2 to 70 bar,

Temperature: 30 to 60°C,

Volumetric flow rate 3 to 10 h<sup>-1</sup>,

Ratio of H<sub>2</sub>/acetylene compounds (mol/mol) = 0.5 to 3,

Noble metal catalyst of group VIII,

0.01 to 1% by weight stabilized by at least one metal of the group formed by Au,

Ag, Sn.

10. (Amended) A process according to claim 1, further comprising adjusting the temperature of the hydrogenation effluent upstream from the recycling level in the rectification zone of the distillation column.

Please add the following new claims:

--11. A process according to claim 1, wherein said portion of feedstock enriched with acetylenic compounds is drawn off laterally from the drainage zone.

12. A process according to claim 2, wherein the majority of hydrocarbons have 4 carbon atoms.

13. A process according to claim 3, wherein the butadiene content in the feedstock is at least 50% by weight.

14. A process according to claim 4, wherein the feedstock contains at most 2.5% by weight of acetylene compounds.

15. A process according to claim 5, wherein the flow rates are approximately equal.

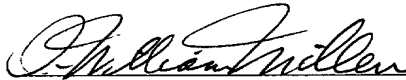
16. A process according to claim 9, wherein the group VIII metal comprises palladium.--

**REMARKS**

A principal purpose of this Preliminary Amendment is to remove the multiply dependent claims and avoid the fee associated therewith, applicant reserving the right to reintroduce claims to canceled combined subject matter.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version With Markings To Show Changes Made**".

Respectfully submitted,



I. William Millen (Reg. No. 19,544)  
Attorney for Applicants

MILLEN, WHITE, ZELANO & BRANIGAN, P. C.  
2200 Clarendon Boulevard, Suite 1400  
Arlington, Virginia 22201  
(703)812-5325  
Internet address: millen@mwzb.com

**Filed: 12-21-01**

IWM(pdr)K:\PET\1975\prelim amend.wpd

## Version With Markings To Show Changes Made

### In the Claims

The claims have been amended as follows:

2. (Amended) Process A process according to claim 1, wherein the feedstock is a steam-cracking effluent that contains for the most part hydrocarbons with four to five carbon atoms per molecule ~~and preferably a majority of hydrocarbons with four carbon atoms.~~

3. (Amended) Process A process according to ~~one of claims 1 and 2~~ claim 1, wherein the butadiene content in the feedstock is at least equal to 20% by weight ~~and preferably equal to 50% by weight.~~

4. (Amended) Process A process according to ~~one of claims 1 to 3~~ claim 1, wherein the feedstock contains at most 20% by weight of acetylene compounds, ~~advantageously at most 5% and preferably at most 2.5% .~~

5. (Amended) Process A process according to ~~one of claims 1 to 4~~ claim 1, wherein the draw-off flow rate is at most equal to twice the ~~one~~ flow rate of the feedstock; ~~advantageously at most equal to one and one-half times the flow rate of the feedstock and preferably approximately equal to the one of the feedstock that is introduced in~~ into the distillation zone.

6. (Amended) Process A process according to ~~one of claims 1 to 5~~ claim 1, wherein the feedstock is introduced at a level that ~~essentially~~ corresponds to substantially the center of the distillation column; the lateral draw-off level is located below said center of the column at a height that corresponds to fewer than five theoretical plates from said center; and the hydrogenation effluent is recycled above the center of the column at a level that corresponds to ~~at most the~~ a height of within the first five theoretical plates from the top of the column.

7. (Amended) Process A process according to ~~one of claims 1 to 6~~, wherein claim 1, conducting the process so that the ratio of the acetylene compounds/butadienes concentrations is the highest at the level of the lateral draw-off ~~is essentially the highest.~~

8. (Amended) Process A process according to ~~one of claims 1 to 7~~ claim 1, wherein the operating conditions of the distillation zone are as follows:

Number of theoretical plates: ~~40~~, preferably 35-45

Absolute pressure: 4-10 bar, ~~preferably 5 bar~~

Top temperature: ~~45°C~~, preferably 30°C to 50°C

Bottom temperature: ~~95°C~~, preferably 90°C to 150°C

9. (Amended) Process A process according to ~~one of claims 1 to 8~~ claim 1, wherein the operating conditions in the hydrogenation zone are as follows:

Absolute pressure: 2 to 70 bar, ~~preferably 5 to 15 bar~~

Temperature: 30 to 60°C, ~~preferably 35°C to 45°C~~

Volumetric flow rate 3 to 10 h<sup>-1</sup>, ~~preferably 4 to 8 h<sup>-1</sup>~~

Ratio of H<sub>2</sub>/acetylene compounds (mol/mol) = 0.5 to 3,  
preferably 1.0 to 1.1

Noble metal catalyst of group VIII, ~~preferably palladium~~;

0.01 to 1% by weight stabilized by at least one metal of the group formed by Au,  
Ag, Sn.

10. (Amended) Process A process according to ~~one of claims 1 to 4~~, wherein claim 1, further comprising adjusting the temperature of the hydrogenation effluent is controlled upstream from the recycling level in the rectification zone of the distillation column.

Claims 11-16 have been added.